



# *Investigative System Improvement Project*



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**Phoenix Police Department**

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**Phoenix Police Department**



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John Hsueh—Questioned Documents  
David Rath—Sex Crimes  
James Owens—Document Crimes  
Mike Meislich—Homicide  
Ken Laird—Assaults  
Claudia Piano—Crimes Against Children  
Jody Wolf—Triage  
Cindy Lucas—Violence Impact Project  
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### **Executive Summary**

In November 2003, the Phoenix Police Department (PPD) engaged Business Enterprise Mapping (BEM) to assist them in developing a strategic objective designed to improve the PPD's Investigative System. Utilizing the successful process mapping methodology employed by the Records & Identification Bureau as its model, the PPD obtained funding from the National Institute of Justice and the City of Phoenix to undertake the projects described herein.

The project planning team, process owners, and process teams worked closely together to identify and document 23 processes that would eventually form the foundation of the investigative system, specifically as it relates to improving the capabilities and capacities of the crime lab. Through a series of interactive process mapping sessions facilitated by BEM, the core processes were documented, together with the identification, prioritization, and categorization of opportunities to improve said processes. The collaborative mapping sessions were attended by subject matter experts from the Laboratory Services Bureau, Property Management Bureau, Patrol, Violent Crimes Bureau, Property Crimes Bureau, and the Records & Identification Bureau. The importance of the collaboration of members from these bureaus cannot be overstated. On several occasions, their participation in groups outside their own assisted in early problem resolution through enhanced process awareness and/or improved communication.

After 7 months, at least 72 mapping sessions, 2 formal group exercises, and considerable analysis, the basic project was completed and a solid system of 23 interrelated processes was created. Upon completion, the project team members affirmed prioritization and categorization decisions of over 600 opportunities to improve, most of which were related to the processes themselves. Of particular note, approximately 10% of the opportunities were quickly resolved by process experts through immediate action and effective communication.

The next phase of the Investigative System Improvement Project is defined by the Department's efforts toward making improvements. The PPD is currently developing plans to resolve the remaining opportunities through a systematic approach to problem solving and an organizational commitment to excellence, a commitment manifested by enhanced collaboration, shared responsibility, increased awareness of problem-solving techniques, alignment of performance objectives, and recognized evidence of success.



**Phoenix Police Department  
Laboratory Services Bureau  
Crime Laboratory Improvement Program**

**Investigative System Improvement Project  
*National Institute of Justice Crime Laboratory Improvement Program*  
(2003)**

**Introduction**

The Phoenix Police Department's Laboratory Services Bureau is currently constructing a \$40 million crime laboratory. This project is scheduled to be completed in the summer of 2007. It is the goal of the Department and the citizens of the City of Phoenix, who approved the bond issue to finance the project, to modernize the crime laboratory environment from its 1970s original design to one that will accommodate rapid advances in technology and increasing demand for efficient and effective service. While the new facility is a vital element of the lab's improvement program, it is but one in a series of solutions that are deemed necessary to enhance the capabilities and capacities of the Phoenix Police Department's crime lab.

A detailed assessment of current concerns revealed issues that are not unlike those of many labs throughout the country. Crime lab directors often cite environment, equipment, and people as the three major components to be addressed in an effort to improve crime lab effectiveness, with "more people" as a common priority. However, a more thorough examination reveals a critical fourth component that is often overlooked—namely, work process analysis and improvement. It is opined herein that a concerted effort in identifying, analyzing, and improving work processes to a "best practice" level that promotes the effective and efficient provision of services will result in the crime lab's ability to better meet the needs of crime lab customers without a primary reliance on additional personnel.

Given the current state of limited local government funding options and the concurrent demands for crime lab excellence from the local, state, and national level, it is incumbent upon leadership to continue to seek alternative funding sources in an effort to satisfy the need for excellence. Therefore, the Phoenix Police Department (PPD) requested approval of an innovative plan that required the usage of a portion of its 2003 Congressionally earmarked Crime Lab Improvement Program funds to develop more responsive work processes without sacrificing quality and timeliness of services provided.





## **Project Narrative**

In March 2003, the National Institute of Justice published its *Report to the Attorney General on Delays in Forensic DNA Analysis*. This report was prepared in response to Attorney General John Ashcroft's direction "to assess the existing analysis delays of crime scene DNA evidence and develop recommendations to eliminate those delays" (NIJ, 2003). While the focus of the report is related to the DNA backlogs, related causes, and reduction strategies, many of the recommendations submitted by the task force can easily be applied to the broader spectrum of total crime lab improvement, an application that would include DNA.

At the time of project development, the PPD's crime lab was comprised of nine scientific analysis units, including crime scene response, evidence processing, latent print comparative, trace analysis, firearm analysis, questioned documents, forensic biology, toxicology, and controlled substances. During the project, an additional unit was added, namely, triage. It was determined that all of these units could be improved by developing effective strategies in response to the recommendations described in the NIJ report, including, but not limited to:

- Improving analysis capacity,
- Helping crime labs reduce backlog,
- Supporting training and education for forensic scientists, and
- Providing training to the many requestors of crime lab services.

Statistical problem-solving techniques traditionally include a primary link between crime lab improvement and additional scientific personnel. Additional personnel will surely improve capacity and eliminate backlogs regardless of scientific discipline. However, a steady influx of new people will only have the metaphorical effect of treating the symptom, not providing a cure. A more thorough examination of the maladies associated with crime labs reveals technological equipment insufficiencies, process inefficiencies and redundancies, and internal and external communication breakdowns.

By positively addressing these issues through the procurement of additional and more technologically advanced equipment, as well as initiating the critical analysis and improvement of internal work processes, the PPD's crime lab will make significant inroads in its efforts to reduce backlogs in all work units and provide effective and efficient services to its customers. Furthermore, enhanced awareness among all parties of the various investigative and prosecutorial processes that affect the activities performed within the crime lab will also have a significantly positive effect on its capacities and capabilities.



While improvements have been made through the procurement of additional equipment, those improvements will be addressed under separate cover. This case study is limited to the successful process improvement element of the Phoenix Police Department's crime lab improvement program, a project entitled, "Investigative System Improvement."

The following section describes how through process analysis and improvement the crime lab has supplemented the positive impact generated by the acquisition of additional workspace and equipment. By examining inputs, processes, and outputs; by developing an enhanced understanding of internal processes, as well as those external processes that affect crime lab performance; and by systematically identifying and resolving opportunities for improvement, the Phoenix Police Department's Laboratory Services Bureau is elevating its abilities to meet the needs of its customers.

### **Crime Lab Process Improvement**

Forensic crime laboratories, including the PPD crime lab, have been accredited by the American Society of Crime Laboratory Directors (ASCLD) for many years. This organization is responsible for the development of standards and protocols utilized throughout the United States in an effort to ensure credibility and effective analysis of evidence across jurisdictional boundaries. The ASCLD Laboratory Accreditation Board (ASCLD/LAB) "is a voluntary program in which any crime laboratory may participate to demonstrate that its management, operations, personnel, procedures, equipment, physical plant, security, and health and safety procedures meet established standards" (ASCLD/LAB Manual, 2000).

While ASCLD/LAB accreditation ensures effectiveness within crime labs in terms of the various elements described above, it does not necessarily address customer satisfaction issues, opportunities for improvement, and the significant place held by the crime lab in the system of interrelated investigative processes. In November 2003, 10 crime lab members of PPD's Laboratory Services Bureau, participated with 17 investigative and Technical Services Division members in an effort to lay the preliminary foundation for crime lab and investigative process improvement. This exercise was facilitated by Business Enterprise Mapping (BEM), Inc., of Scottsdale, Arizona, experts in business system design and process development, analysis, and improvement. BEM utilized the business assessment techniques employed by the PPD's Records & Identification (R&I) Bureau, an organization that in July 2003 became the first law enforcement unit in the United States to certify its quality management system to the ISO 9001:2000 international business quality standard.

Through an interactive series of questions and answers, a process expert representing each of the 23 core disciplines provided high-level information related to process deliverables; internal





communication; external communication; process inputs; process outputs; evidence handling; evidence analysis; evidence storage techniques, retention requirements, and disposal methods; and preliminary improvement opportunities. The core disciplines that were represented in this exercise are shown in Table 1.

<u>Investigation Unit</u>	<u>Crime Lab Unit</u>
Property/Document Crimes/Embezzlement	Evidence Processing
Homicide	Latent Print Examination
North Property Investigations	Toxicology
Auto Theft	Questioned Documents
Domestic Violence	Crime Scene Response
Property Management	Firearms
Document Crimes/Forgery	Trace
Crimes Against Children	Forensic Biology
Court Liaison	Controlled Substances
Night Detectives	
Robbery	
Drug Enforcement	
South Property Investigations	
Evidence Inventory	

**Table 1.** Initial units included in Business Assessment

The formal report associated with this assessment was prepared, and the preliminary findings were very clear. The crime lab and all of its internal work processes provide the investigative units, and ultimately the court system, with vital information related to scientific analysis of evidence. Unfortunately, disconnected priorities and unsatisfactory communication among all parties oftentimes were cited as negative issues that lead to cases being worked unnecessarily after adjudication is complete, ineffective evidence disposal notification, internal pressures to relieve mounting backlog, and, in a worst-case scenario, cases either not being filed or lost based on inadequate investigation/information. Furthermore, because of the various concerns related to backlog and case load, process experts are not afforded the time to critically examine their processes in an effort to effectively identify improvement opportunities and streamline their activities. As a result, a typical solution to this issue is, again, to provide more people.

Because of the positive impact experienced by the Records & Identification Bureau in its successful development of an entire system of interrelated processes, the PPD executive staff requested the continued use of process development and analysis to improve the investigative



system. In a drastic departure from law enforcement norms of adding more people as the primary solution, the PPD proposed the engagement of process improvement experts to completely analyze its investigative system of interrelated processes, a significant element of which is the crime lab. A brief discussion of process improvement follows in an effort to identify and describe the value associated with undertaking a project of this magnitude.

As described by H. James Harrington, process improvement is a disciplined approach to the streamlining of business processes, using measurements and controls to foster continual improvement (Harrington, 1991). As indicated earlier, the PPD has already experienced success in terms of process analysis and improvement through its innovative application of business quality standards in the R&I Bureau. Through a structured methodology and the stringent requirements of the ISO 9001:2000 standard, the R&I Bureau has effectively completed the typical phases of a successful process improvement initiative, specifically:

- Establishing leadership commitment and understanding and communicating that commitment to staff,
- Understanding the individual processes and the interrelated links that define the process system,
- Documenting the “as is” process and identifying improvement opportunities,
- Identifying metrics that will effectively measure process performance, and
- Continually improving each process that comprises the system (1991).

Using a similar methodology as that employed by R&I, the first two phases in the Department’s investigative improvement project have been completed. The business assessment described earlier is indicative of the Department’s commitment, and the initial results of the assessment describe the individual processes and the critical links that help form the system. The Investigative System of Interrelated Processes is depicted in Diagrams 1-3. However, significant work is required to complete the final three phases.



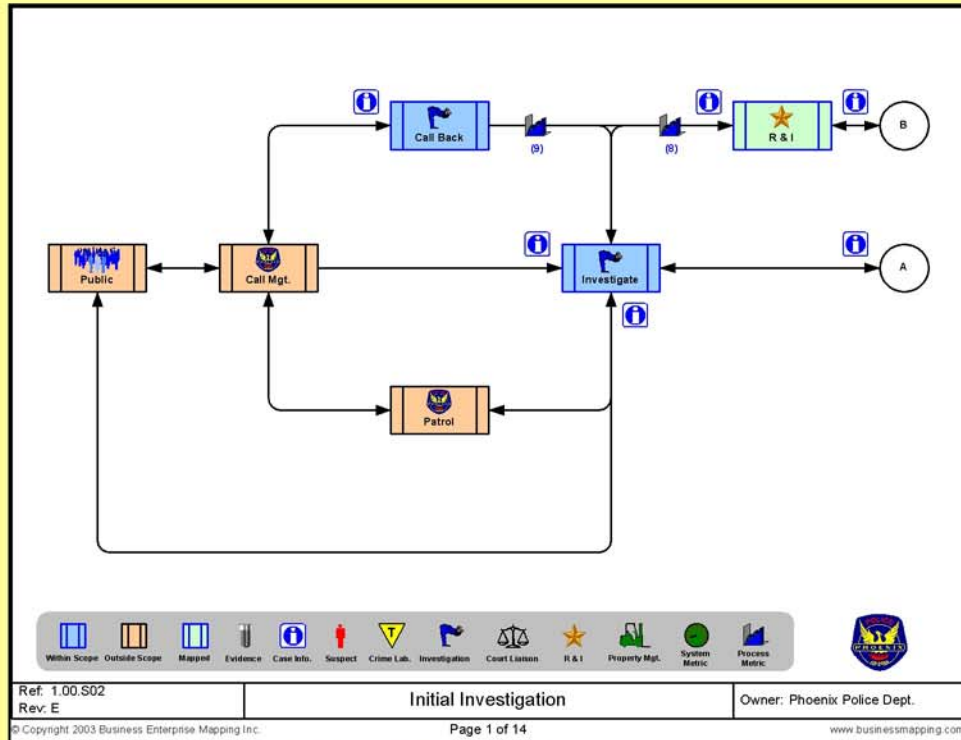


Diagram 1. Investigative System of Interrelated Processes—Initial Investigation.

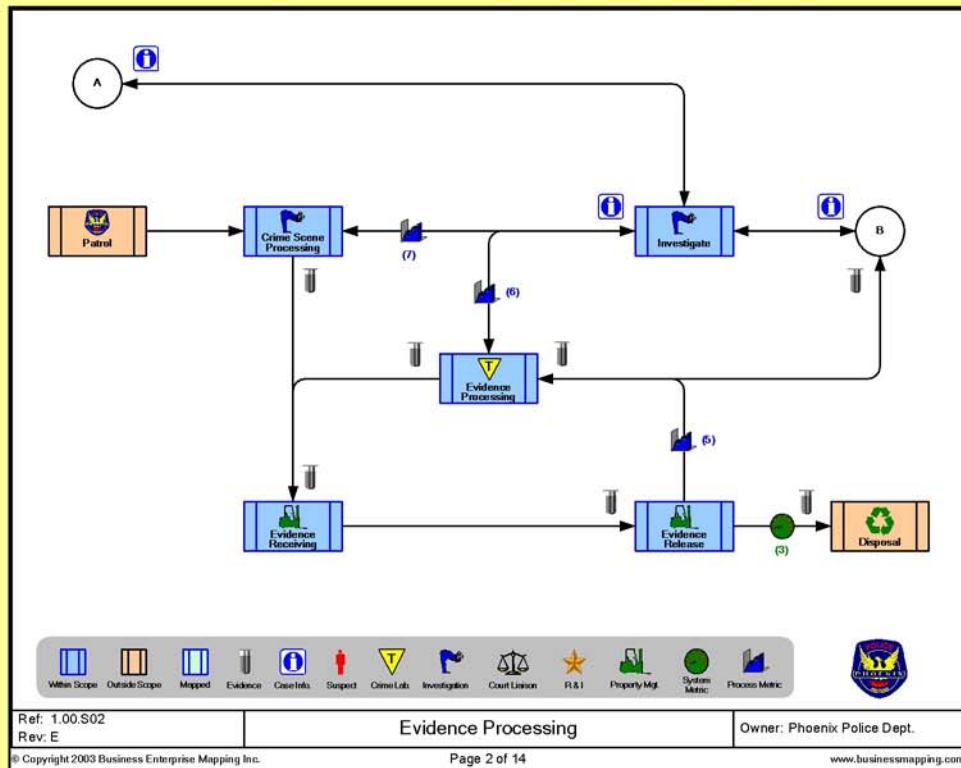
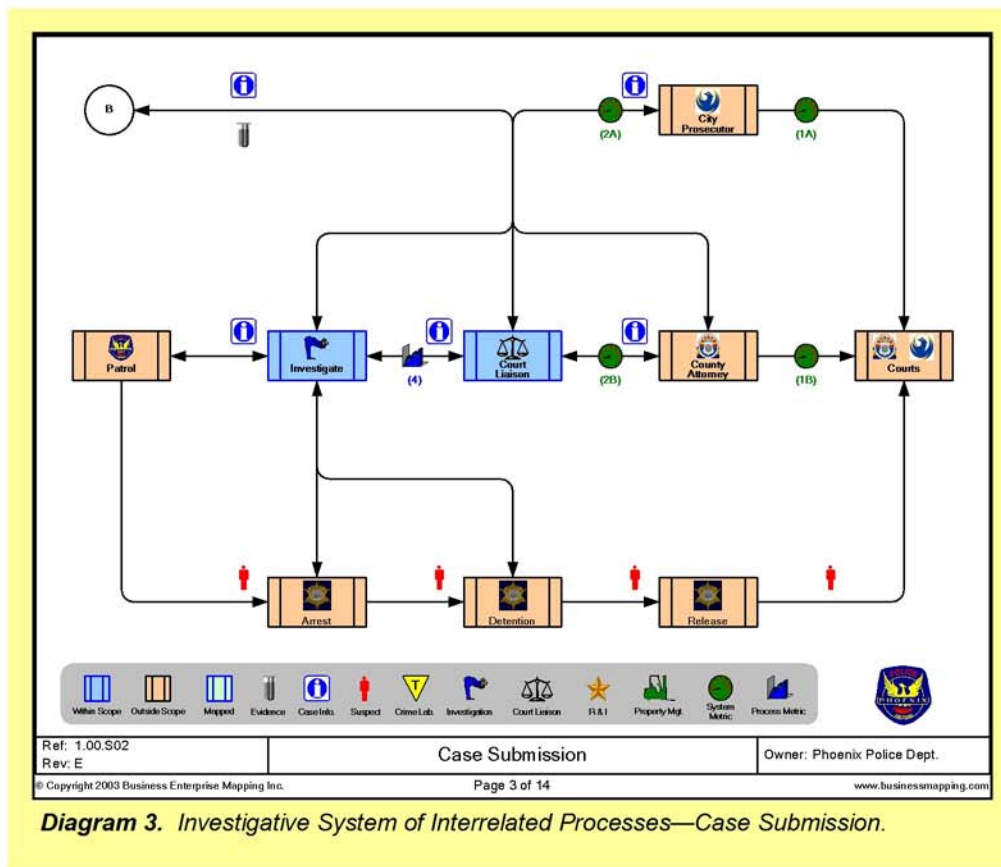


Diagram 2. Investigative System of Interrelated Processes—Evidence Processing.



The process improvement technique has also been examined and is recommended in an industry closely related to law enforcement. In May 2003, SEARCH, The National Consortium for Justice Information and Statistics partnered with the National Center for State Courts and published *Court Business Process Enhancement Guide*. The guide indicates that court management improvement opportunities run parallel to those in the PPD crime lab, and SEARCH asserts that process documentation and improvement can positively resolve those opportunities (SEARCH, 2003). Although documentation is an important part of this framework to provide evidence that quality practices are consistently being used effectively, the preponderant emphasis is on regularly developing quality processes that facilitate the successful delivery of products and services.

Since the desired level of improvement of the crime lab is contingent upon the effectiveness of its processes in relationship to the overall investigative system, the Phoenix Police Department requested funding to employ process mapping experts to work with process owners, process users, and eventual customers to assist in the development of a documented system of interrelated processes. This unique partnership will enable crime lab personnel to develop an understanding of the needs and expectations of crime lab customers and, as a result, will





facilitate the development of service processes that meet those needs now and in the future. Additionally, the involvement of all related parties in the documentation of crime lab work processes will also positively address the various training elements recommended in the 2003 NIJ report previously referenced, specifically crime lab personnel and crime lab users.

Although the initial process mapping of the crime lab processes and those investigative processes related thereto satisfies the third phase of improvement, the development of performance metrics and the identification of continual improvement techniques must also be satisfied before complete improvement can be realized. Through additional training, process metrics will be identified and included as an integral part of the maps. Furthermore, continual improvement techniques will also be developed beyond the levels that currently exist in the crime lab, such as corrective action, preventive action, periodic process assessments, and simple improvement suggestions. Process metrics and continual improvement are closely related by the often-used expression, "One cannot improve what one does not measure."

The Crime Lab Improvement Program plan was submitted to the NIJ for approval in January of 2004 by the Planning & Research Bureau. While under review and while responding to various clarification requests from the NIJ, the PPD elected to engage Business Enterprise Mapping to begin a related process system development and mapping project, to include process owner training, process development, process analysis, process connectivity, and improvement review and prioritization. The Department selected the Latent Print Section of the Laboratory Services Bureau, to include processes associated with Evidence Processing, Latent Print Comparative, and Automated Fingerprint Identification System (AFIS). A description of the project follows.

#### *Interim Project—Latent Print Section*

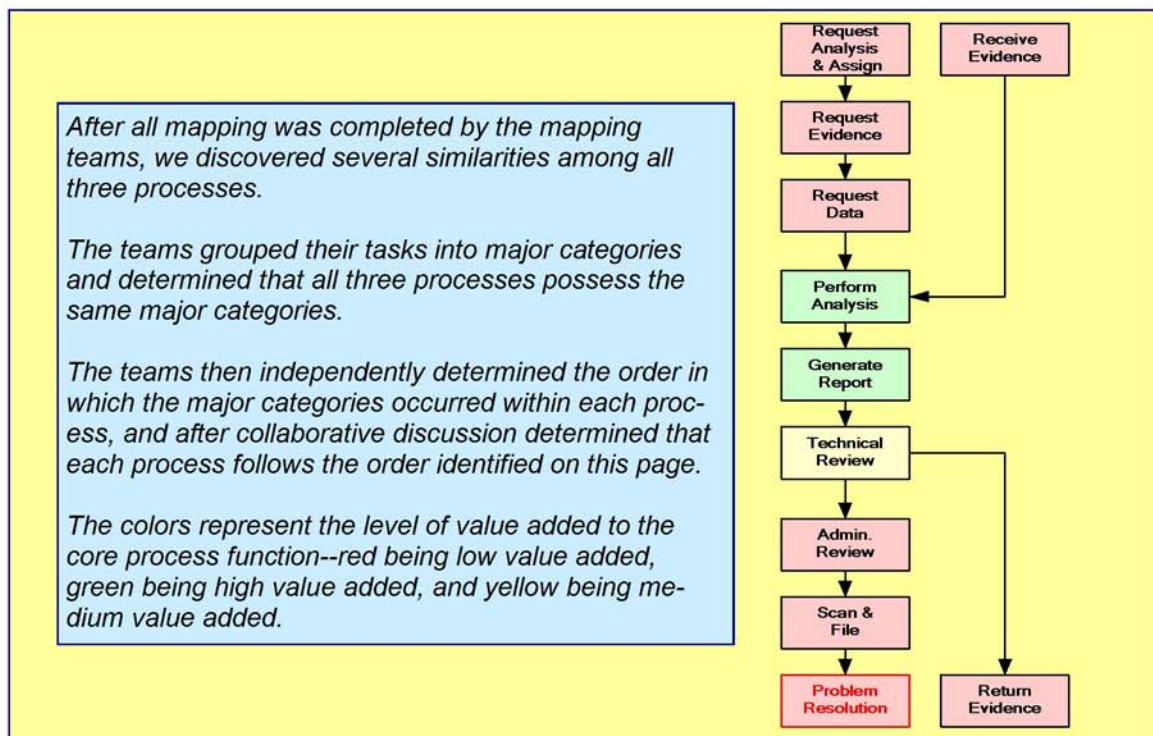
As a first step in this process development project, each process is assigned an owner and that each process owner is trained to manage the flow of information related to the continual improvement of his/her process. The responsibilities of said owner are to assemble a team of experts, both internal and external process users, as well as customers and suppliers. Users provide the expertise necessary to describe the current "as is" condition of the process and identify opportunities to improve. Customers provide to the users valuable information related to their expectations, information that is vital to assisting personnel in developing processes intended to meet those needs. Additionally, process owners are trained to manage continual improvement of the process by facilitating the exchange of information among users and ensuring adequate training is provided to all users, thus making certain that standardized processes are used that ultimately lead to customer satisfaction.



In August 2004, the latent print team assembled for process owner training. The team learned the basic elements of process development, including how the interrelationship of processes is important to the effectiveness and efficiency of the organization, process control, process symbols, customer and supplier identification, product/service deliverables, and benefits of process documentation. They also learned about their upcoming responsibility in accomplishing the goals of this interim project. Upon completion of the training, BEM facilitated the documentation of the three process maps.

For the next four months, each process map was developed, improved, and ultimately completed through a series of facilitation sessions and the completion of “homework” assignments. During each session of process development, team members were encouraged to identify opportunities for improvement to their processes. They were also challenged to release their hold on “the way they’ve always done it” and begin thinking of ways to improve. While the release of old methods was difficult, several improvement ideas were implemented.

As the processes were mapped by individual teams, many similarities were discovered by team members when group exercises were performed. When individual process tasks were combined into categories and the order of the categories were arranged by each process team, the result was the development of an identical process flow, as seen in Diagram 4.

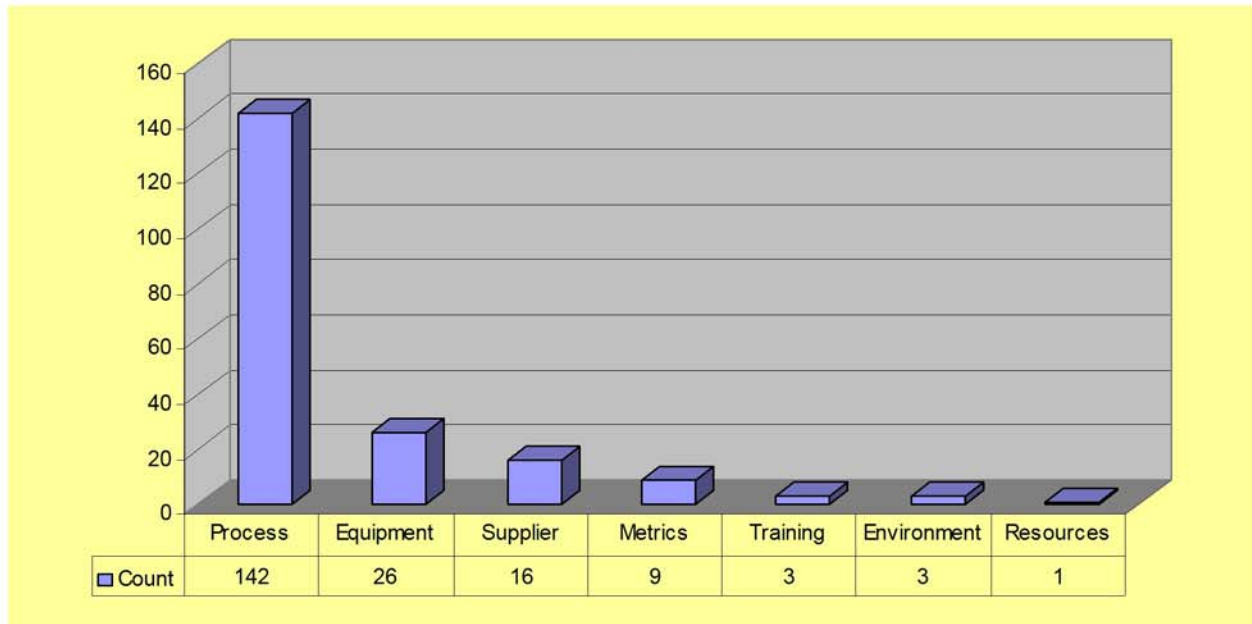


**Diagram 4.** Latent Print Section general process flow





Throughout the mapping process, the teams identified opportunities for improvement. These opportunities were then categorized and prioritized by the process teams. The resulting categories are displayed in Chart 1.



**Chart 1.** *Categorization of Latent Print Opportunities to Improve.*

Through analysis of the Latent Print Project, the team discovered the following elements:

- Approximately 57% of the improvement opportunities are process related
- Basic processes and opportunities for improvement are almost identical
- All three processes contain a significant number of non-value-added tasks
- Processes require too much checking without effectiveness measures
- Processes contain little to no problem prevention points
- There exists significant waiting for and/or moving evidence
- Current processes are not effective—significant backlog
- Section is buried in paper—not fully utilizing Laboratory Information Management System
- There exists a lack of process performance metrics
- Misaligned employee perception of process objectives—ASCLD/LAB versus Customer Satisfaction

The results of this project were summarized and presented to the leadership team of the Laboratory Services Bureau. The leadership team then established the commitment necessary to proceed to the next phase of process improvement, namely, determine and gather relevant data and begin developing improvement methods based on the data gathered.



This improvement phase became *Phase 2—Impact Project* and would become a related element of the Investigative System Improvement Project.

In February 2005, the PPD was notified by the National Institute of Justice and the Phoenix City Council that the project funding was approved. The PPD again engaged Business Enterprise Mapping to ensure project continuity, and in March 2005, the project commenced.

#### *Investigative System Improvement Project*

Although final notification of project funding and City Council approval was received in the latter part of February 2005, planning for project commencement was ongoing. The original business assessment performed in November 2003 was again utilized to select the processes that would be included within this project, and final selection of the 20 project processes and the naming of process owners for each process was completed. The processes selected are shown in Table 2. As a result, the project activities began very quickly after being given approval to proceed.

Controlled Substances	Sex Crimes
Property Crimes North	Document Crimes
Auto Theft	Homicide
Crime Scene Response	Assaults
Property In	Crimes Against Children
Property Out	Triage
Court Liaison	Violence Impact Project
Investigating the Crime Scene	Toxicology
Forensic Biology	Firearms
Questioned Documents	Robbery

**Table 2.** *Project Processes*

The project teams and Business Enterprise Mapping employed the same process mapping methodology that had been used by the R&I Bureau in developing its ISO 9001:2000 registered system and that had been used by the Latent Print Section in preparing for operational improvement. Process owners were trained, and each map went through a three-level development approach in an effort to reach a 95% map accuracy level. In total, the mapping phase of the project spanned 60 facilitation sessions. Again, process teams were mapping “as is” processes and were very forthcoming in identifying opportunities to improve.

During the mapping phase, the project team identified an additional crime lab process, the





inclusion of which would complete the roster of scientific crime lab disciplines within the PPD. Using PPD employees to augment the work performed by Business Enterprise Mapping, the Trace Analysis process was mapped to the same level of completion as the original 20 project maps. This additional process added three additional facilitation sessions, resulting in 63 mapping facilitations.

As the project progressed from March 2005 through September 2005, all process owners and interested stakeholders were updated regularly through a series of "Action Reports" that informed recipients of project accomplishments and upcoming assignments with associated due dates. Stakeholders included division chiefs/director, bureau administrators/commanders, project planning team members, county attorney, and city prosecutor.

Running concurrently with this phase of the Investigative System Improvement Project was Phase II of the Latent Print Section project. The objective of Phase 2 was to educate team members on systematic problem-solving skills and to apply those skills in an effort to improve process effectiveness and efficiency. Business Enterprise Mapping conducted the training and used the previously developed process maps as the resource to determine what data would be gathered as benchmark data. The project teams for Evidence Processing and Latent Print Comparative processes identified input and output data collection points and began to develop methods for collecting representative data that would assist them in improving their processes.

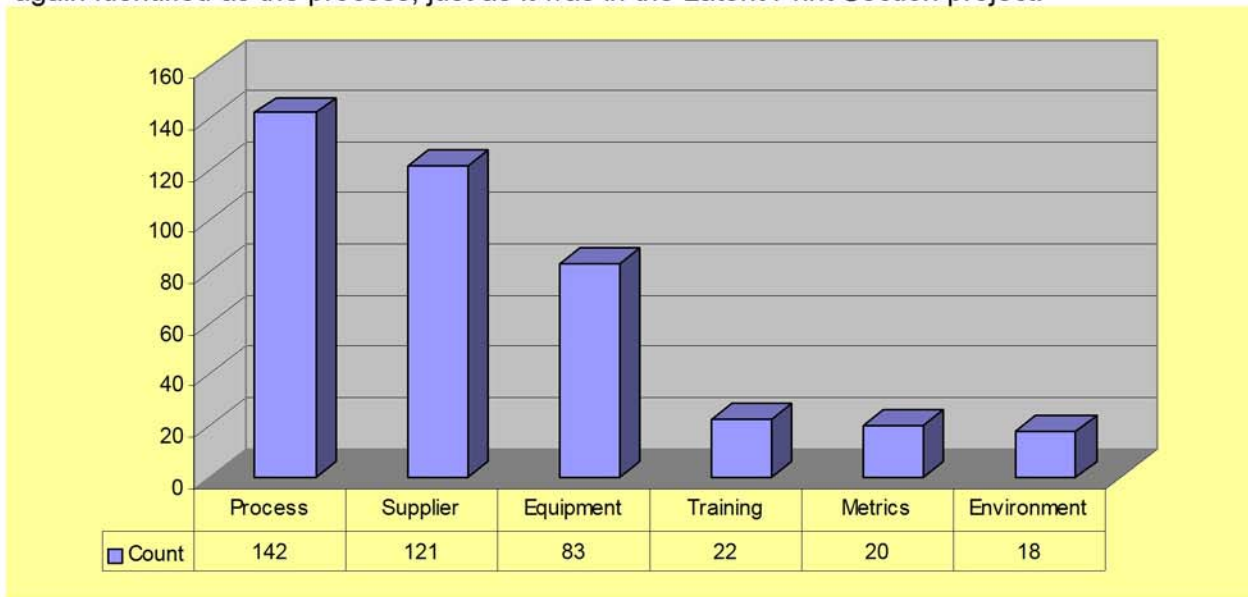
As of this writing, the Evidence Processing and Latent Print Comparative process teams have had difficulty gathering data that provide sufficient information upon which they can act. They continue to modify their collection points and methodology so that they can proceed with a reasonable degree of certainty that they are addressing the correct opportunities. As Phase 2 continues and ultimately concludes, a report will be prepared as a supplement to this document.

In September 2005, all process mapping activities had concluded, and a group exercise was facilitated and performed in a large conference room. The purpose of this exercise was to ensure that process owners were exposed to all project maps and to solidify their process linkages to form an investigative system of interrelated processes. All project processes identified in Table 2 were represented, as well as Evidence Processing, Latent Print Comparative, and Trace. The session was interactive and resulted in additional opportunities being identified, in addition to several opportunities being resolved.

Throughout October 2005, the process owners met individually with Business Enterprise Mapping and the PPD Management Representative to categorize and prioritize their opportunities to improve. The meetings resulted in similar findings as those identified in the



Latent Print Section project. As shown in Chart 2, the primary improvement category was again identified as the process, just as it was in the Latent Print Section project.



**Chart 2.** Categorization of Investigative System Improvement Project Opportunities to Improve

Process owners identified Suppliers as the next top improvement category. Suppliers are either internal or external people who supply the process users with raw information. The process users then perform the tasks required within their processes to ultimately deliver an acceptable finished product to the customer. This categorization clearly shows how closely linked each process is within the investigative system. When the customer-supplier process objectives are not closely aligned, opportunities for improvement are created. The systematic resolution of supplier improvement opportunities will reduce redundancies and close gaps.

In addition to process improvements and enhanced customer-supplier relationships, the project identified several other opportunities for improvement, including:

- Tools and Equipment
  - ◊ Systems interfaces
  - ◊ Identification of needs
- Measurement by Fact
  - ◊ Identifying meaningful performance metrics
  - ◊ Strategic planning based on performance
- Education and Training
  - ◊ Existing and future PPD process improvement methodologies
- Culture and Change Management
  - ◊ Foster gradual change through PPD environmental support





## **Project Conclusion**

In December 2005, a presentation summarizing the Investigative System Improvement Project was given to the PPD Executive and Command Staff. The presentation highlighted the important elements contained within this document. Moreover, it also identified the activities necessary for the PPD to fully realize the benefits of this improvement initiative, including:

- Continuing departmental commitment to improve
- Recognizing the need to modify PPD performance culture
- Removing potential roadblocks to success
- Supporting the completion of Phase 2 of the Latent Print project in 2006

The projects described herein are a solid foundation for a successful future in effectively and efficiently providing safety and security for the PPD community and the City of Phoenix. This departmental foundation was built through excellent inter-bureau cooperation, across division boundaries, including Records & Identification, Laboratory Services, Violent Crimes, Family Investigations, Property Crimes, Property Management, and Patrol Operations. Although the objectives of this project have been met, additional processes have been identified, the development of which will augment the Investigative System Improvement Project and will further solidify process interrelationships and improve PPD performance.

In addition to improving the investigations segment of the Department, business process development and improvement have become key components in the Department's balanced scorecard strategic planning methodology for the future, not only as they relate to investigations, but also as they relate to many of the support units. Improvement projects are already beginning or are in the planning stages as they relate to these units, including: Fiscal Management, Legal Unit, Incident Review Unit, Community and Patrol Services, Professional Standards Bureau, and Communications Bureau.

The Department is continuing to pioneer performance improvement initiatives in law enforcement using proven business tools, such as process mapping and improvement, ISO 9001:2000 international business standards, and the balanced scorecard strategic planning approach. These improvement efforts will not only assist the PPD in accomplishing its goal of becoming the safest major city; they will establish the PPD as a model of excellence for law enforcement and government agencies.



### **Works Cited**

American Society of Crime Laboratory Directors. (2000). Laboratory Accreditation Board Manual.

Harrington, H. James. (1991). Business Process Improvement: The Breakthrough Strategy for Total Quality, Productivity, and Competitiveness (1st ed.). New York: McGraw-Hill.

National Institute of Justice. (2003). Report to the Attorney General on Delays in Forensic DNA Analysis.

SEARCH, The National Consortium for Justice Information and Statistics, and The National Center for State Courts. (2003). Court Business Process Enhancement Guide.